

JOURNAL OF THE
BOSTON SOCIETY
OF
CIVIL ENGINEERS



APRIL - 1933

VOLUME XX

NUMBER 4

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715 Tremont Temple, Boston

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Published Monthly, except July and August, by the Society
715 Tremont Temple, Boston, Massachusetts

Subscription Price, \$4.00 a Year (10 Copies)
50 Cents a Copy

Copyright, 1933, by the Boston Society of Civil Engineers.
Entered as second-class matter, January 15, 1914, at the Post Office
at Boston, Mass., under Act of August 24, 1912.

Acceptance for mailing at special rate of postage provided for in
Section 1103, Act of October 3, 1917, authorized on July 16, 1918.

*The Society is not responsible for any statement made or opinion
expressed in its publications.*

BOSTON
WRIGHT & POTTER PRINTING COMPANY
32 DERNE STREET

JOURNAL OF THE BOSTON SOCIETY OF CIVIL ENGINEERS

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OBSERVATIONS CONCERNING OUR ECONOMIC DEPRESSION

PRESIDENTIAL ADDRESS BY RALPH W. HORNE,* BOSTON SOCIETY OF
CIVIL ENGINEERS, MARCH 15, 1933

DURING the past year it has been my duty as chairman of the Registration Committee of the Engineers' Division of the Emergency Planning and Research Bureau, Inc., to interview each person who has secured employment with the Bureau, considerably over three hundred in all, and to interview many more to whom the Bureau was not able to give employment. These first-hand accounts of the privations and misfortunes of so many of our fellow engineers have given me a vivid appreciation of the extreme seriousness of this depression among many in our own profession.

Most of the interviews have brought out much the same questions, namely, how may we recognize the approach of an economic depression; how long are depressed business conditions apt to last; what will assist a recovery in engineering activities; and how may we fortify ourselves against future depressions?

A sympathetic desire to reassure the men has led me to seek plausible answers to the several questions, and to consider how our Society may assist the profession to fortify itself against a future depression.

By reviewing the salient events of our major depressions, I have attempted to find similar developments which preceded each, and to learn the approximate duration of the depressed business conditions. Prior to the present depression, those of the 1870's and the 1890's were outstanding in points of magnitude and duration.

* Member of the firm of Fay, Spofford & Thorndike, Consulting Engineers, 44 School Street, Boston, Mass.

THE DEPRESSION OF THE 1870's

The events which accompanied the approach of the depression of the 1870's were the development of an extremely favorable foreign grain trade soon after the close of our Civil War, the excessive abuse of our resultant increased purchasing power, overspeculation in securities, over-inflation of credit in general and particularly for the extensive railroad expansion which accompanied the opening up of our "New Northwest." In 1871, following the Treaty of Paris which ended about seventeen years of European war, the raising of large grain crops abroad, coupled with our own extensive grain crops, resulted in overproduction, and our foreign grain trade was practically ruined. A serious break in the stock market occurred, closely followed by "runs" on numerous banks and the failure of several large industrial concerns. The severe collapse occurred in 1873.

Business drifted along without much pronounced improvement until 1879, when developments brought about mostly by nature started us on the road to recovery. In that year failure of European grain crops was accompanied by bumper crops in the United States. Moreover, there was failure of the cotton crop in India and a first-class crop in America. A large foreign demand for our grain and cotton was the immediate result, with an attendant rise in prices. Business in general commenced to improve, and the trade revival which ensued was the most remarkable which our country had experienced; it included practically all of our industries.

The depression lasted about six years.

THE DEPRESSION OF THE 1890's

The depression of the 1890's followed a period of profitable foreign grain trade in 1890 and 1891, extravagant purchases of foreign goods, extensive borrowing from the banks, a shortage of our gold reserves in 1893, the infusion of paper money into our currency and overspeculation in the stock market, especially in railroad securities. Early in 1893 a large railroad went into bankruptcy, and shortly after banks began to fail; a serious break in the stock market occurred, and by the end of the year scores of banks had failed and over seventy railroads were in the hands of receivers. In 1894 the country barely escaped going off the gold standard as a result of the severe drain on our gold supply, caused by our purchases from Europe in 1894 of American securities which Europe bought at bargain prices the year before. Factories were closed and unemployment and privation were widespread.

The definite turn for the better did not come until late in 1896. Important factors in the revival of business were our success in maintaining the gold standard and the extensive mining of newly discovered gold deposits in the United States and South Africa, accompanied by improved processes for extracting the metal from the ore. The substantial increase in our gold supply, resulting from mining operations, led to higher prices for commodities which, in turn, afforded a foundation for business recovery. Extensive construction of railroad trackage which commenced in 1896, and the building activity which followed the development of the steel frame type of building, played an important part in the return of prosperity, which we were again enjoying in 1899.

The depression had lasted about five years.

THE DEPRESSION OF THE 1930's

As far back as the days of the great World War the foundations were laid upon which the depression of the 1930's was built. During the war, production and construction for normal peace-time needs, both in America and in Europe, had been greatly curtailed, and at the close of the war a demand soon developed to replenish the shortage which had been created in this country. Moreover, there was an excessive demand from abroad for American products to satisfy peace-time requirements, which could not be met by European industries in their disorganized condition. To meet these excessive production requirements our industries were expanded and developed, — in numerous cases overdeveloped, — and technological improvements in manufacturing methods were introduced, thereby increasing our industrial production per worker. Demands for our products exceeded the supply, and rising prices naturally resulted.

This situation was accompanied by extensive speculation in real estate and in commodities during 1920. Finally, credit for speculation was curtailed, and without speculation to support prices they began to fall, accompanied by a substantial setback in security prices which extended well into 1921. This recession lasted nearly one and one-half years in this country. The 1920-21 recession extended to Europe, and although our country recovered from it in 1922, European countries did not. It continued abroad until the present depression of the 1930's.

The depressed economic conditions and scarcity of money abroad caused foreign countries to seek large loans from our country. Our loans served to finance much trade which we secured from abroad, and this renewed the incentive to increase the productive capacity of our industries.

After our recovery from the recession of 1920-21 there followed in this country a period when credit was easily obtainable, and this credit served not only to encourage foreign loans but also to give the support necessary for the greatest stock market boom our country has ever known. This boom commenced in 1924 and culminated with the crash in the autumn of 1929.

Our domestic demands for our own products were greatly expanded from 1922 to 1929 by the easy credit conditions which facilitated extravagant purchasing on the installment and deferred payment bases. Domestic purchasing also was increased in volume by the use of credit easily available from paper profits in the stock market. During the seven or eight years immediately preceding the stock market crash of 1929 the installment purchases outstanding in this country multiplied seven or eight times, and the sales to domestic consumers during this period substantially exceeded their money income during the same interval, and consequently their economic ability to pay. The flood of buying led many industries to develop their productive capacity beyond their ability to sell. Our volume of production increased nearly 50 per cent, with no increase in the number of wage earners. Prices and wages remained practically constant throughout the entire period. Without an increase either in wages or wage earners, our domestic buying power could not expand, and the buying rampage of our citizens was bound to exhaust itself.

Without the continued support of domestic purchasing there developed a condition of overproduction, and the operation of the old law of "supply and demand" brought about reduced selling prices for our products. Reduced manufacturing activity naturally followed in an effort to relieve the condition of overproduction — and with it came unemployment. Reduced prices for products were reflected also in reduced earnings for our industries and reduced values for their securities.

With a severe downward plunge of security prices in the stock markets in 1929, our present depression was visibly on its way, and its intensity was increased by the shrinkage of American credit for foreign loans and the consequent withdrawal of support for the foreign buying of American products.

The closing of banks and the tightening of credit for loans increased the privations attendant on widespread unemployment. Public confidence became unsettled by these conditions and by the fear lest we should abandon the gold standard. Large withdrawals of gold from the banks and hoarding of money finally led to the declaration of a "bank holiday" throughout the Nation.

VISIBLE INDICATIONS OF THE APPROACH OF AN ECONOMIC DEPRESSION

The histories of each of the last three major depressions which our country has experienced show much the same cycle of visible developments leading up to the final crash, — a period of favorable and profitable trade conditions followed by a period of easily obtainable credit, excessive expansion of credit, overspeculation accompanied by extravagant expenditures and use of credit, finally resulting in overproduction, falling prices, a severe stock market decline, unemployment and depressed business.

DURATION OF AN ECONOMIC DEPRESSION AND ITS EFFECT UPON
ENGINEERING ACTIVITIES

A minor depression or business recession has occurred with reasonable regularity about every three and one-third years, but generally has not been of long enough duration to seriously affect our economic equilibrium. Such a business recession has rarely lasted more than one to two years, and its effect has not been felt universally. The effect of depressed business upon engineering activities generally has not been felt until a year or more after the beginning of the slump, and in a short recession of one to two years the business recovery may come so soon that engineering activity will not seriously be affected.

In the case of a major economic depression such as has occurred at about twenty-year intervals the effect on business is quite certain to extend for a period longer than two years. The longer and more prosperous the boom period which precedes a depression, the longer may be the corrective period or economic depression. If we may judge from the major depressions of the 1870's and 1890's, a major economic depression may last at least five or six years.

In a period of major economic depression, activities in the engineering profession are quite certain to be seriously affected; in the present depression the effect on engineering became pronounced about one and one-half years after the stock market break. Whether or not recovery in engineering activities will lag behind general business recovery will depend largely upon the construction industry. Construction of railroads and buildings, financed by private capital, aided considerably in the recovery from the depression of the 1890's, but the construction of railroads, buildings or industrial plants on a broad scale certainly does not appear to be warranted at present. Construction of necessary and legitimate public improvements could aid materially in keeping men at work and in reducing present unemployment; furthermore, it would tend to sustain engineering activities.

UNDERTAKINGS WHICH WOULD AID A GENERAL RECOVERY AND ASSIST A RECOVERY IN ENGINEERING

No single branch of our economic activities can prosper long without general participation by all branches. A sustained recovery in engineering activities can come only with a recovery in general business as a whole.

General business recovery is conditional upon the renewal of the purchasing power of the masses of our citizens and their progress in retiring their debt burden incurred during high prices and now made more severe by reduced wages and unemployment. The longer the depression continues the stronger will grow the inertia tending to retard recovery.

It is reasonable to expect that recovery in business will commence in one field of activity and spread gradually at first, gaining momentum as it spreads until this progressive growth of activity eventually develops into general recovery.

It is difficult to see how a recovery can commence in those industries which produce products to be purchased by the masses, because of the impoverished purchasing power of the masses, both at home and abroad, and because of their uncertainty as to the future. Those who possess capital in sufficient volume to be an influencing factor in a recovery are primarily interested in investment of their capital for income and profit, and must be convinced of an attractive opportunity for investment before parting with their funds. Present depressed business conditions do not afford such immediate opportunities. In fact, public business is practically the only business which can expand without regard for immediate profits. Now is a time when municipalities should be active in undertaking necessary and sensible improvements which will aid in putting men to work, rather than to postpone these improvements and put men on the dole.

Construction, which is now at an extremely low ebb, is ordinarily among our Nation's largest industries, constituting about one-fifth of our normal business, and the construction of major public improvements which are necessary and legitimate, including rehabilitation of municipal utilities, may well furnish the spark needed to kindle the flame of recovery. No practical program to speed our recovery will now spread the burden of cost more equitably according to the ability to pay than public improvements financed by taxation. Moreover, public improvements are legitimate because they provide for the masses of our citizens the ordinary conveniences for living conditions, health, education, transportation and

communication which formerly were available only to persons of considerable means. By providing such facilities on a large scale through co-operative effort they may be had far more economically than by any other method.

Already we are spending huge sums through welfare agencies because of nation-wide unemployment, and these sums are being raised by taxation; moreover, these huge expenditures will continue to be paid through taxation until this depression is over. However, direct welfare distribution does not increase the public wealth and will never materially aid the recovery. On the contrary, it will gradually undermine and deaden those qualities of self-respect, ambition, ingenuity, industry and thrift which have been developed so successfully here in America. Above all things, we must avoid the economic waste of the dole.

It is most decidedly to the interest of those who must pay the bill for unemployment to spend their money in such manner that it will provide legitimate employment and thereby assist and speed the recovery. To provide work for the masses of unemployed by undertaking widespread, necessary, sensible public improvements, including the rehabilitation of municipal utilities, and to pay a reasonable wage which will provide more than the bare necessities of life, — rather than to dole out a mere pittance through direct welfare assistance, — will aid in renewing the fast waning or vanished purchasing power of the unemployed, and thereby help to restore their confidence and to bring about the desired results. Our best hope of recovery lies in a program to restore the buying power of the great masses of our citizens.

Public improvements produce a permanent increase in the public wealth, and are one of the few construction activities that do not eventually require a purchaser; therefore they afford a definite opportunity to provide surplus buying power which is one of our present vital needs. Construction of self-supporting public improvements has received national approval as a most effective means of creating employment, conserving the public wealth and welfare, and promoting business recovery.

If our states, counties, cities and towns do not choose voluntarily to aid the recovery by undertaking to provide work on a broad scale through expenditures for needed public improvements, our Federal government, according to recent indications, is almost certain to do so, and many municipalities will then find themselves taxed for public improvements carried out at places remote from their locality, rather than for improvements which would relieve their own unemployment.

To spread the benefits of available work among as many people as possible employers should adopt flexible working periods and should main-

tain their number of employees intact in so far as practicable. This applies to the engineering profession as well as other fields of employment. The necessity for spread work will be with us for a long time.

Engineers should assist the recovery in engineering activity through a well-organized and energetic educational campaign of our engineering societies, — perhaps in co-operation with the industries and trades which depend on construction for a livelihood, — and by otherwise actively and persistently exerting their influence toward the appropriation and expenditure of unemployment relief funds for necessary and lasting public improvements, and toward the undertaking of such improvements at an early date. We must aid ourselves and not wait for the natural course of events to assist us. Much activity on our part is needed to retard the extreme swing of the pendulum toward indiscriminate reduction of all public expenditures. This is in no way contrary to the generally recognized need for economy in government through greater efficiency and elimination of waste and luxury. In fact, construction of needed public improvements at times of unemployment when costs are relatively low is true economy.

STEPS TO FORTIFY OURSELVES AGAINST FUTURE DEPRESSIONS

In a democracy such as ours it is doubtful if we could or would govern the ambitions of human nature and business enterprise to the extent of completely smoothing out the business cycle and eliminating depression. Therefore we should develop methods of fortifying ourselves against depression.

Advance planning of public improvements has long been a recognized necessity, but it is doubtful if the advantages of long-range planning to mitigate the effects of depression have been clearly appreciated until recently. If all needed public improvements were planned over a period of years in advance, according to relative urgency, and if a program of the necessary attendant expenditures were worked out with equal care, it would be possible to so arrange the carrying out of these improvements as to maintain a reasonably uniform tax rate over a period of years; and, furthermore, it would be possible to step ahead and concentrate the construction of needed improvements in sufficient volume during periods of general business depression to be a material factor in the relief of unemployment.

Our normal public works constructions directly employ nearly one million men annually, and two or three times as many more indirectly; therefore, by concentrating this work in years of depression and reduc-

ing the volume during years of prosperity, construction of public improvements could be made an important aid in stabilizing employment.

To reduce the tax burden during depression, the schedule of expenditures for planned improvements should be based on a "pay as you go" or "short-term bond" policy during periods of prosperity, and on the use of long-term bond financing during times of depression, thus keeping immediate tax costs at a minimum in "hard times."

An unemployment reserve fund to lessen the burdens of unemployment during depression may be accumulated either by an individual to insure his independence, or by co-operative effort and used for work relief.

Most people engaged in the engineering profession have it within their power to accumulate during times of prosperity a personal unemployment reserve fund with which to carry themselves and their family through a period of depression. This protection has by no means been overlooked by the members of our profession, if we may judge from the records of the Emergency Planning and Research Bureau, Inc., which indicate that of the total registered unemployed approximately two-thirds to three-fourths have been able to carry themselves without assistance from the Bureau.

For the average individual to be reasonably well fortified to carry himself and his family through a major economic depression it would appear that he should have accumulated a non-shrinkable reserve, readily convertible into cash, amounting to about 50 per cent of his normal expenditures over at least two to three year periods.

For more than a year the Emergency Planning and Research Bureau, Inc., sponsored by the Engineering Societies of Boston and the Boston Society of Architects, has operated on much the same principle as a co-operative unemployment reserve fund, to provide for destitute unemployed engineers and architects paid work along the general lines for which their training and experience has qualified them. In this instance the funds were not raised in advance of their need, but they were raised from the professions benefited. To relieve the effects of a future depression a co-operative unemployment reserve fund, contributed either by employers or employees, or by both, might be accumulated during years of prosperity, to be administered during a future period of unemployment in much the same way as the present funds of the Emergency Planning and Research Bureau, Inc.

The necessary legal machinery would, of course, have to be set up to hold and manage the funds during the accumulative period, or the scope

of the Emergency Planning and Research Bureau, Inc., might be broadened to include these functions.

Judging from present records of the "Bureau" it would appear that the funds needed to carry the destitute unemployed members of the engineering profession, in the Boston Metropolitan area, through a depression such as the present, would amount to a sum representing at least two to three years' pay at 30 to 40 per cent of normal wages for about 5 per cent of the total number normally employed in the profession in this Metropolitan area.

RECOMMENDATION

Our own Boston Society of Civil Engineers was the prime mover among the local engineering groups in the movement to create the Emergency Planning and Research Bureau, Inc. There is now an opportunity for us to perform a similar service in connection with the establishment of a co-operative unemployment reserve fund.

I therefore recommend that our Society sponsor a movement to study the advisability of, and methods for, establishing and administering an Engineers' Unemployment Reserve Fund while the lessons of the present depression are fresh in mind.

IN CONCLUSION

Regardless of how the present depression has affected us personally, we as Americans should hold our confidence and our courage on a high and steady plane, with the knowledge that America has a 100 per cent record of fighting her way straight through every depression to new and higher peaks of prosperity.

OF GENERAL INTEREST

PRIZES AWARDED AT ANNUAL MEETING, MARCH 15, 1933

The Desmond FitzGerald Medal

Presentation made by Carroll A. Farwell, Member of the Committee on Award

Mr. Desmond FitzGerald, who in 1910 instituted and endowed the Desmond FitzGerald award, was born at Nassau, in the Bahama Islands, in 1846, and died in Brookline, Massachusetts, in 1926. He was educated in the public schools of Providence, Rhode Island, studied art in France, as at that time he desired to become a sculptor, and attended Phillips Andover Academy from which he was graduated in 1864.

His early experience was varied. While still under age he became Deputy Secretary of the State of Rhode Island, and later was private secretary to General Burnside, then the Governor of the State. He worked upon railroad and Federal river improvements in the West. In 1871 he returned to Boston, serving as engineer on the Boston & Albany Railroad, and then as superintendent of the Western Division of the Boston Water Works. This position he held from 1873 until 1898, when the Metropolitan Water Board was formed, and under which he was engineer of the Sudbury Department until he resigned in 1902.

Mr. FitzGerald served as consulting engineer on many important undertak-

ings, largely in connection with water supply problems in various parts of the United States.

Mr. FitzGerald took an active interest in public affairs, serving on various state commissions and in various capacities in his home town of Brookline. Throughout his life he was a lover of art, and had, adjoining his residence, an art gallery to house his large collection of paintings.

His professional activities were constant. He took part in the revival of the Boston Society of Civil Engineers in 1873 and 1874, and was later elected its President. He was elected an Honorary Member of the Society in 1915. He became a member of the American Society of Civil Engineers in 1884, served as Director and Vice President, and finally, in 1899, as President, and was elected an Honorary Member of that Society in 1923. He served as President of the New England Water Works Association and was an Honorary Member of the American Water Works Association, as well as holding membership in the American Institute of Consulting Engineers.

The Desmond FitzGerald award provides that a bronze medal is to be

awarded annually for a paper presented to the Society by a member, and published during the year, which shall be judged worthy of special commendation for its merit. The award is made by the Board of Government, and on behalf of this Board and of the Boston

Society of Civil Engineers it gives me great pleasure to present the medal to Mr. Clarence R. Bliss for his paper, "Fifteen Mile Falls Lower Development," presented at a meeting of the Society on May 20, 1932, and published in the September, 1932, JOURNAL.

The Clemens Herschel Prizes

Presentation made by Vice President John B. Babcock

In presenting the Clemens Herschel prizes this year it seems appropriate to give a brief outline of the man who established this award. Throughout a long and eminent career as a civil engineer, particularly in the field of hydraulics, Clemens Herschel maintained an active interest in the affairs of the Boston Society of Civil Engineers and was a liberal contributor to its library.

Clemens Herschel was born on March 23, 1842, graduated from the Lawrence Scientific School of Harvard University in 1860, and after a period of further study in France and Germany returned to the United States and began his practice as a civil engineer. Although in his earlier years the author of a book on "Continuous Revolving Drawbridges" in 1875, and Railroad Commissioner of Massachusetts from 1881-83, Herschel devoted the major portion of his life work to hydraulics. Probably his greatest contribution to civil engineering was his intensive research in the flow of water and his subsequent development of the practical methods of measuring it. Early in his career Herschel became a student of that master of hydraulics, James B. Francis (1815-92), for more than forty years the "agent and engineer of the Proprietors of the Locks and Canals of the Merrimack River" at Lowell, Massachusetts, and author of "Lowell Hydraulic Experiments," in whose activi-

ties it had been Herschel's privilege to take part.

In 1879, Herschel became hydraulic engineer of the Holyoke (Massachusetts) Water Power Company, where he remained for ten years. Later he served as superintendent and chief engineer of the East Jersey Water Company. From 1900 to 1930 he acted as consultant on many important hydraulic developments in the United States, and made notable contributions to the technical literature of the times.

His most important work probably resulted from his activities with the Holyoke Water Power Company. Here in 1881 he undertook the construction of the well-known "Holyoke Testing Flume." One of the difficulties at Holyoke was the lack of any means of measuring the wash water supplied to the mills. Quoting his words relative to the pipes supplying this water, he found them "*provokingly secretive of what was passing within their interior.*" Here he developed the Venturi meter for measuring the flow in moderate sized pipes. Its scope has since been extended so that it is now the accepted means of measuring continuously the flow in the largest aqueducts of the present day. This device might readily have been known the world over as the Herschel meter, were it not for the characteristic modesty of the inventor, who named it the Venturi meter in honor of

Giovanni Battista Venturi (1746-1822), an ordained priest and professor of experimental physics at the University of Modena. Venturi was an eminent scientist, who, in the midst of numerous other activities, had made many laboratory studies in which he experimented with the diverging tube which was the basis of the later practical development of the Venturi meter by Herschel. Were it not, however, for the generous self-effacement of Clemens Herschel, the name of Venturi, who had pointed out the way, would have been buried in oblivion. To Herschel was awarded in 1889 the Elliott-Cresson Gold Medal of the Franklin Institute, and at the same time the Scott Legacy Medals were awarded to Connet and Jackson for their development of registering devices. The Venturi meter was awarded the Exposition Gold Medal at the St. Louis World's Fair in 1904. Although the experimental work was done at Holyoke, the first practical application of the Venturi meter was made on the works of the East Jersey Water Company.

Two of Herschel's publications deserve particular note: "115 Experiments," published in 1897, and his "Frontinus and the Water Supply of the City of Rome," in 1897. It is the latter work which forms the basis of the annual Herschel award of our Society. For many years Herschel had been intensely interested in the subject of ancient water supplies and the early methods of measuring the flow of water. As a result he translated from the Latin the two books on "The Water Supply of the City of Rome" of Sextus Julius Frontinus, Water Commissioner of the city of Rome, A.D. 97. Herschel carried out this work with characteristic thoroughness, which included a pilgrimage in 1897 to the monastery at Montecassino, where he delved into the records of the Benedictine brethren and secured

a photographic copy of the manuscript, which was probably prepared in the twelfth or thirteenth century, based on copies dating back to the first century. The final volume as published by Clemens Herschel includes the photographic reproduction of the Montecassino manuscript, the Latin text, the translation into English, together with material of a descriptive nature by Herschel which makes this book most illuminating to the civil engineers of today. Thus we may fairly say that the life of Clemens Herschel embraced the study of hydraulics from the first to the twentieth century of the Christian era.

Although this picture of Clemens Herschel as a renowned civil engineer is essential as a background for the Herschel Award of the Society, it is of equal interest to consider his interest in the Boston Society of Civil Engineers.

On June 8, 1874, Clemens Herschel was one of the band of about fifty engineers in Boston who took part in the resuscitation of the Society after its temporary lapse of activities following the period of the Civil War. Our Society for many years has honored this group of men who established the link connecting us with those early civil engineers who founded the Society on July 3, 1848.

Clemens Herschel served as Treasurer of the Society from 1874 to 1880, at which time his work called him away from Boston. He was President of the Society for the year 1890-91. On March 5, 1915, the Society made him an Honorary Member. His death occurred on March 1, 1930. Although living in New York City for most of the time during the last forty years of his life, his interest in our Society never flagged. He was a constant contributor to our library, and established the Herschel Library, a special section devoted almost exclusively to non-techni-

cal books written by engineers, and to books about engineers.

A few years ago he sent to the Society some autographed copies of his "Frontinus and the Water Supply of the City of Rome," with the request that one or more copies be presented each year for papers which *"have been particularly useful and commendable and worthy of grateful acknowledgment."* Upon his death he left his library to the Society, as well as a substantial bequest for the perpetuation of an award in such manner as the government of the Society should determine.

It is a great privilege to have the opportunity of presenting these prizes which have been awarded by vote of the Board of Government, as follows:

To Frank E. Winsor, Chief Engineer of the Metropolitan District Water Supply Commission, for his paper on "The Metropolitan District Water Supply Tunnel from the Ware River to the Wachusett Reservoir," presented before the Society on October 19, 1932, and published in the November, 1932, JOURNAL.

To Arthur Casagrande, lecturer in the Harvard Engineering School, and formerly representative of the United States Bureau of Public Roads stationed at the Massachusetts Institute of Technology, for his paper on "The Structure of Clay and Its Importance in Foundation Engineering," presented before the Designers Section of the Society on January 13, 1932, and published in the April, 1932, JOURNAL.

The Designers Section Prize

The Designers Section Prize, consisting of books, was presented by Charles E. Nichols, member of the Prize Award Committee, to Howard A. Gray for his paper on "Moisture Penetration in

Exterior Walls," presented at a meeting of the Designers Section on November 12, 1931, and published in the March, 1932, JOURNAL.

PROCEEDINGS OF THE SOCIETY

MINUTES OF MEETINGS

Boston Society of Civil Engineers

MARCH 15, 1933. — The eighty-fifth Annual Meeting of the Boston Society of Civil Engineers was held today at the Boston Chamber of Commerce, and was called to order by the President, Ralph W. Howe, at 4.30 P.M.

The reading of the minutes of the previous meeting was omitted, as these will be printed in the March JOURNAL. The minutes of other previous meetings during the year were declared approved as

printed in the various issues of the JOURNAL.

The Secretary reported that the following were elected to membership by the Board of Government on March 15, 1933:

Grade of Junior: George Henry Tanger.

Grade of Student Member: David Abernathy, Kirkwood Brown, Carlton Stanley Jacobson, George Wilton Jenness.

The annual reports of the Board of Government, Treasurer, Secretary and Auditors were presented. Also reports were made by the following Committees: Membership and Publicity, Social Activities, Relations of Sections to Main

Society, Welfare, Library, Registration of Engineers, Research, Run-off, Subsoils of Boston, Board of Reference and John R. Freeman Fund.

Voted, That these reports be accepted with thanks and placed on file. The President stated that these will be published in the April JOURNAL.

Voted, That the incoming Board of Government be authorized to appoint such committees as it deems advisable.

The report of the Tellers of Election, Prof. Dwight Porter and Murray H. Mellish, was presented by Prof. Dwight Porter, and in accordance therewith the President declared that the following had been elected officers for the ensuing year:

President — Arthur W. Dean.

Vice-President (for two years) — Harold K. Barrows.

Secretary — Everett N. Hutchins.

Treasurer — Karl R. Kennison.

Directors (for two years) — Harry P. Burden and Arthur C. Eaton.

Members of Nominating Committee (for two years) — A. B. Edwards, Frank L. Flood and Lawrence G. Ropes.

The President introduced Arthur W. Dean, the newly elected President. The other officers elected were asked to rise as their names were read.

The retiring President, Ralph W. Horne, then delivered his annual address on "Observations concerning our Economic Depressions."

On motion of Mr. Harry E. Sawtell —

Voted, That the Society express its appreciation to the retiring President for his success in administering the affairs of the Society during the past year.

The meeting adjourned to reassemble at 7 P.M., the annual dinner being held during the interim.

The President then called the meeting to order for the presentation of prizes.

He requested Carroll A. Farwell, Chairman of the Desmond FitzGerald Award Committee, to present the Desmond FitzGerald medal. Mr. Farwell gave a review of the circumstances of the establishment of this medal and of Mr. FitzGerald's professional career. Then he presented the medal to Clarence R. Bliss for his paper on "Fifteen Mile Falls Lower Development," presented at a

meeting of the Society on May 20, 1932, and published in the September, 1932, JOURNAL.

The President called upon Mr. Charles R. Nichols, member of the Designers Section Prize Committee, to present the Section prize, consisting of books suitably inscribed, to Howard A. Gray for his paper on "Moisture Penetration in Exterior Walls," presented at a meeting of the Designers Section on November 12, 1931, and published in the March, 1932, JOURNAL.

The President stated that this year the Board of Government voted to award autographed copies of the late Clemens Herschel's book, "Frontinus and the Water Supply of Rome," for papers of special merit.

Prof. John B. Babcock gave a very interesting biographical sketch of the late Clemens Herschel — his professional accomplishments, — his interest in the Society, and the establishment of this prize. Then he presented the autographed copies of Clemens Herschel's book to the following:

1. Frank E. Winsor, for his paper on "The Metropolitan District Water Supply Tunnel from the Ware River to the Wachusett Reservoir," presented at a meeting of the Society on October 19, 1932, and published in the November, 1932, JOURNAL.

2. Arthur Casagrande, for his paper on "The Structure of Clay and its Importance in Foundation Engineering," presented at a meeting of the Designers Section on January 13, 1932, and published in the April, 1932, JOURNAL.

The President then had the pleasure of announcing that fourteen of the living Past Presidents of the Society were attending this dinner and meeting, and he called on each one to stand as his name was called: Prof. C. Frank Allan, senior Past President and senior member of the Society, Charles T. Main, Frederic N. Fay, Harrison P. Eddy, Col. Charles R. Gow, Charles M. Spofford, Robert Spurr Weston, Gen. Richard K. Hale, Prof. Charles M. Allen, Frank A. Marston, Prof. Charles B. Breed, Frank E. Winsor, Col. Lewis E. Moore, and Harry E. Sawtell.

Five others, unable to be present, sent greetings to the Society: John R. Worcester, James W. Rollins, Frank A. Barbour, Dugald C. Jackson, and Frank M. Gunby.

The President then introduced Mr. Joe Mitchell Chapple, editor, author and world-wide traveler, who gave a most interesting and entertaining address on "Flashlights of Famous People."

Ninety-six members and guests attended the dinner.

The meeting adjourned at 9.15 P.M.

EVERETT N. HUTCHINS, *Secretary*.

Designers Section

MARCH 8, 1933. — The annual meeting of the Designers Section of the Boston Society of Civil Engineers was held on March 8, 1933. The meeting was called to order by Chairman Ropes. The minutes of the previous meeting and the annual report of the Executive Committee were read by the clerk pro tem. and accepted.

Mr. Henderson read the report of the Nominating Committee.

Voted, That the report of the Nominating Committee be accepted and that the clerk cast one ballot for candidates reported by the Committee. The officers for the coming year are:

Chairman — Prof. F. N. Weaver.

Vice-Chairman — W. W. Bigelow.

Clerk — Henry Brask.

Executive Committee — John R. Nichols,
Prof. Albert Haertlein, Mark Linenthal.

Professor Weaver gave a paper on "Unsymmetrical Concrete Arches," followed by a discussion by Mr. O. G. Julian on "Plastic Flow."

Voted, That the clerk be instructed to present to the Chairman of the Publication Committee the Section's recommendation that Professor Weaver's paper be published in the JOURNAL.

There were forty members and guests present.

HENRY BRASK, *Clerk pro tem*.

ANNUAL REPORTS

Report of the Board of Government for the Year 1932-33

BOSTON, March 15, 1933.

To the Boston Society of Civil Engineers:

Pursuant to the requirements of the By-Laws, the Board of Government presents its report for the year ending March 15, 1933.

Membership

Fifteen members, 7 juniors and 43 students have been added during the year, including 7 members and 1 junior who were reinstated. Five juniors have been transferred to the grade of member.

During the year 21 members have died and 27 have resigned, making the total deductions 48.

The present membership of the Society consists of 3 honorary members, 768 members, 155 juniors, 16 associates, 43 student members, and 1 member of the Sanitary Section only, making a total membership of 986.

The honorary membership list now is as follows:

Charles T. Main, elected January 28, 1932.
Dr. Karl T. Compton, elected February 17, 1932.
Prof. C. Frank Allen, elected March 16, 1932.

Deaths

John E. Carty, February 5, 1933.
Gregory P. Connolly, January 16, 1933.
Herbert C. Daggett, March 17, 1932.
John O. DeWolf, November 17, 1932.
Charles L. Edgar, April 14, 1932.
John R. Freeman, October 6, 1932.
Heywood S. French, October 2, 1932.
Nathan Ginsburg, November 24, 1932.
Harrison W. Hayward, October 18, 1932.
Fred E. Hess, May 1, 1932.
William A. Johnson, December 20, 1932.
George A. King, April 26, 1932.
Morris Knowles, November 8, 1932.
Ira W. McConnell, January 8, 1933.
Patrick McGovern, February 22, 1933.
George N. Merrill, June 22, 1932.
William H. Pitman, January 22, 1933.
Elwyn L. Russell, March 20, 1932.
Edward S. Smilie, March 21, 1932.
William Wheeler, July 1, 1932.
Orville J. Whitney, August 21, 1932.

Remission of Dues

Under authority of By-Law 8, the Board of Government has remitted the dues of ninety-seven members, a much greater number than in any previous year; but such action is considered advisable in these times of serious unemployment.

Exemption of Dues

Sixty-seven members are now exempt from dues in accordance with By-Law 8, which provided that "a member of any grade who has paid dues for forty years, or who has reached the age of seventy years and has paid dues for thirty years, shall be exempt from further dues." Twenty-two of these members have contributed an amount equivalent to dues for the current year.

Meetings of the Society

Nine regular meetings have been held during the year, and a joint outing with the New England Water Works Association on June 28, 1932, at the Oak Hill Country Club, Fitchburg. An all day excursion and inspection trip was made on October 22, 1932, to the Water Supply Sources of the Metropolitan District, including the new dam at Enfield, the new tunnel structures, and some of the existing works, under the guidance of Mr. Frank E. Winsor, Chief Engineer of the Metropolitan District Water Supply Commission.

The average attendance at the meetings of the Society was 110, the largest being 233 and the smallest 60. Buffet suppers have been a feature of all the meetings. The papers and addresses given were as follows:

March 16, 1932. — Annual Meeting. Address of retiring President, Harry E. Sawtell, "Society Research," followed by dinner, smoker and entertainment.

April 20, 1932. — "Bond in Masonry Construction," by Prof. Walter C. Voss, Associate Professor of Building Construction, Massachusetts Institute of Technology.

May 18, 1932. — "Recent Developments in Concrete Construction," by J. L. Herber, Engineer, "Incor" Division of the Lone Star Cement Company of New York, Inc.

September 21, 1932. — "New Incinerators at Washington, D. C.," by H. P. Eddy, Jr., of Metcalf & Eddy, Consulting Engineers.

October 19, 1932. — "The Metropolitan District Water Supply Tunnel from the Ware River to the Wachusett Reservoir," by Frank E. Winsor, Chief Engineer, Metropolitan District Water Supply Commission.

November 22, 1932. — "Weather and Blind Flying," by Prof. Daniel C. Sayre, Assistant Professor of the Aeronautical Engineering Department, and by Prof. Carl Gustaf A. Rossby, Professor of Meteorology, both at Massachusetts Institute of Technology.

December 21, 1932. — "Design and Construction of the Waldo-Hancock Bridge," by R. M. Boynton, Assistant Engineer, Robinson & Steinman, Consulting Engineers, New York.

January 25, 1933. — "Protection of Hartford South Meadows," a symposium by Roscoe N. Clark, City Engineer, W. S. Brewer, Resident Engineer, and William A. D. Wurts, Designing Engineer, all of Hartford, Connecticut; Frederick H. Fay of Fay, Spofford & Thorndike, Consulting Engineers, Boston; Prof. Kenneth C. Reynolds and Prof. Glennon Gilboy of Massachusetts Institute of Technology.

February 15, 1933. — "The Organization and Work of the Bureau of Reclamation," by George O. Sanford, Chief of the Engineering Division, Bureau of Reclamation, United States Department of the Interior.

Sections

Seventeen meetings and three inspection trips were held by the Sections of the Society during the year. These meetings of the Sections, offering opportunity for less formal discussion, have continued to demonstrate their value to their members and to the Society. The variety of subjects presented has made an appeal to the members, as indicated by the general attendance at these meetings.

Sanitary Section Meetings. — The Sanitary Section has held four meetings during the year, with an average attendance of 36. The papers and meetings are listed in the report of the executive committee of the Section.

Designers Section Meetings. — The Designers Section has held eight regular meetings during the year. The average attendance has been 38. The papers and meetings are listed in the report of the Executive Committee of the Section.

Highway Section Meetings. — The Highway Section has held two regular meetings during the year, the annual meeting and an excursion to the East Boston vehicular tunnel in October. About 150 members and guests took advantage of the opportunity to see the new construction work of this tunnel.

Northeastern University Section. — The Northeastern University Section has held six meetings, including two inspection trips, during the year, with an average attendance of 80.

Journal

The complete report of the Editor of the JOURNAL for the calendar year 1932 will be printed in the April JOURNAL.

*Funds of the Society**

Permanent Fund. — The Permanent Fund of the Society has a present value of about \$50,000. The Society again authorized the use of the income of this fund, amounting to \$2,488.80, in payment of current expenses.

John R. Freeman Fund. — The John R. Freeman Fund was established by the late John R. Freeman, Past President and honorary member of the Society. The income of this fund is to be devoted to the encouragement of young engineers, for scholarships, or for the publication of valuable papers on hydraulics. The present value of the fund is about \$26,000. Mr. Charles T. Main, Past President, and member of the John R. Freeman Fund Committee, has recently been chosen Chairman to succeed Mr. Freeman.

Clifford P. Kittredge completed the second year, ending June, 1932, as holder of the Freeman Fund Traveling Scholarship. Laurence De Fabritis was selected to hold the scholarship for one year, beginning June, 1932. The scholarship provides for a year's study and work in the European Hydraulic Laboratories.

With the approval of this Committee, the Board of Government voted to appropriate \$300 of the current income from this fund for the publication of the discussion of the report of the Flood Committee presented at the Society meeting in November, 1930, and published in the December, 1932, JOURNAL.

Edmund K. Turner Fund. — This fund has a present value of about \$1,000, "the income of which is to be used for library purposes." The Board voted on February 15,

* Details regarding the values and income of these funds are given in the Treasurer's report.

1933, that \$50 of the income of this fund for the current year be used for binding volumes in the library.

Alexis H. French Fund. — The Alexis H. French Fund, amounting to \$1,000, was received in 1931 from the late Alexis H. French of Brookline, a former Past President of the Society. The income of this fund is "to be devoted to the library of the Society." On February 15, 1933, the Board of Government voted that \$75 of the income of this fund be appropriated to defray the cost of permanent binding of volumes in the library.

Desmond FitzGerald Fund. — The Desmond FitzGerald Fund, established by a bequest from the late Desmond FitzGerald, a Past President and honorary member of the Society, provides that the income from this fund shall "be used for charitable and educational purposes." The Board voted on February 15, 1933, that \$200 of the income from this fund be appropriated to pay for the cost of publishing one of the papers in the JOURNAL for the current year. The Board voted, on January 25, 1933, to appropriate this year, from the income of this fund, the sum of \$100, to be known as the Boston Society of Civil Engineers Scholarship in memory of Desmond FitzGerald, to be given to a student at Northeastern University, and this will be presented to the selected student at a special meeting of the students to be held at an early date at the University. The present value of the fund is about \$2,000.

Tinkham Memorial Fund. — The "Samuel E. Tinkham Fund," established at the Massachusetts Institute of Technology by the Society "to assist some worthy student of high standing to continue his studies in civil engineering," had a value of \$2,516.33 on July 1, 1932. Mr. Ingrald E. Madson of Medford, Massachusetts, a student in civil engineering in the class of 1933 at Technology, has been awarded this scholarship for the year 1932-33.

Attention is called to the fact that the tuition at the Massachusetts Institute of Technology is now \$500 per year, whereas the income from the Tinkham Fund is about \$125. Additional donations to this fund would make it of greater service for the purpose for which it was established.

Clemens Herschel Fund. — This fund was established in 1931 by a bequest from the late Clemens Herschel, a former Past President and honorary member of the Society. The income from this fund is to be used for the presentation of prizes for commendable papers presented at meetings of the Society. The present value of this fund is about \$1,000. This year the Board voted that a part of the income be used for the purchase of books for prizes.

Prize Awards

Desmond FitzGerald Medal. — The Desmond FitzGerald medal (bronze) was provided for in 1910 as an endowed prize by the late Desmond FitzGerald, and is to be awarded annually to a member who presents an original paper to the Society which is published in the JOURNAL for the current year.

In accordance with the recommendation of the Committee on Awards, the Board of Government voted to award the Desmond FitzGerald medal to Clarence R. Bliss, member, for his paper on "Fifteen Mile Falls Lower Development," presented to the Society on May 20, 1932, and published in the September, 1932, JOURNAL.

Section Prizes

Designers Section Prize. — The Board voted on April 12, 1924, "to present a prize for a worthy paper given in each Section by a member of that Section," this award to consist of books suitably inscribed.

The Board has adopted the recommendation of the Special Committee on Section Awards, and voted that the Designers Section Prize be awarded to Howard A. Gray, member, for his paper on "Moisture Penetration in Exterior Walls," presented at a meeting of the Designers Section on November 12, 1931, and published in the March, 1932, JOURNAL.

Clemens Herschel Award

The late Clemens Herschel had assigned to the Society a number of copies of his book on "Frontinus and the Water Supply of the City of Rome," with the request that the Board award one or more of the books each year as prizes for papers which have been particularly useful and commendable and worthy of grateful acknowledgment.

The Board has voted to present at this time copies of this book to the following:

1. Frank E. Winsor, for his paper on "The Metropolitan District Water Supply Tunnel from the Ware River to the Wachusett Reservoir," presented before the Society on October 19, 1932, and published in the November, 1932, JOURNAL.

2. Arthur Casagrande, for his paper on "The Structure of Clay and its Importance in Foundation Engineering," presented at a meeting of the Designers Section on January 13, 1932, and published in the April, 1932, JOURNAL.

Social Activities

Six of the regular meetings of the year have been held at Chipman Hall, Tremont Temple, and two meetings have been held at the Engineers Club, preceded by buffet suppers, under the direction of the Social Activities Committee. There is general satisfaction with the efforts of the Social Activities Committee. As usual, the most enthusiastic meeting was the Student Night, attended by members of the student Engineering Societies of Massachusetts Institute of Technology, Harvard, Tufts and Northeastern University, at which time representatives of the musical clubs of the latter school assisted in the entertainment.

Library

The report of the Committee on Library contains a complete account of the library activities during the year.

Society Activities

The usual special committees dealing with the general activities and conduct of the Society have included the following: Program, Publication, Library, Social Activities, and Membership and Publicity. Other special committees have included the following: Subsoils of Boston, Run-off, Research, Registration and Licensing of Engineers, Relation of Sections to the Main Society, Awards of Prizes, Board of Reference and Welfare Committees. Each of these committees has made a distinct contribution to the Society, and has developed fields of endeavor which will prove of great benefit to the members.

The Society has co-operated with the Engineering Societies of Boston, and many members of the Society have served on Engineering Societies' committees.

Your Board, in conclusion, wishes to express its appreciation of the excellent work done by the officers of the Sections and by the committees of the Society.

For the Board of Government,

RALPH W. HORNE, *President.*

Report of the Treasurer

BOSTON, March 10, 1933.

To the Boston Society of Civil Engineers:

Your treasurer submits the three appended tables: Table 1, presenting receipts and expenditures on account of the Society's seven funds; Table 2, recording investments and the income therefrom; and Table 3, summarizing the distribution of assets.

All interest and dividends of the Permanent Fund were transferred to the Current Fund. The following is a brief statement of current expenditures, year by year, and shows the extent to which they have been met by the transfer of Permanent Fund income:

	1928-29	1929-30	1930-31	1931-32	1932-33
Net expenditures (except such as provided for by appropriations from other than Permanent Fund income)	\$9,489	\$9,815	\$9,443	\$10,086	\$8,734
Members' dues received	7,635	7,794	8,028	7,045	,6,030
Deficit	\$1,854	\$2,021	\$1,415	\$3,041	\$2,704
Transfer of Permanent Fund income to Current Fund	\$2,404	\$2,544	\$2,647	\$2,664	\$2,489

Unexpended income from the investments in funds other than the Permanent Fund has accumulated as follows:

John R. Freeman Fund	\$319 83
Edmund K. Turner Fund	6 37
Desmond FitzGerald Fund	112 16
Alexis H. French Fund	4 77
Clemens Herschel Fund	62 78

All securities have been carried on the books at their cost. Recent changes in the total amounts of the Society's two principal funds are as follows:

	March 1, 1929	March 1, 1930	March 1, 1931	March 10, 1932	March 10, 1933
Permanent Fund:					
Book value	\$47,876	\$48,688	\$49,108	\$50,081	\$50,263
Market value	—	—	53,457	46,488	42,937
John R. Freeman Fund:					
Book value	\$27,473	\$27,615	\$26,721	\$26,722	\$26,200
Market value	—	—	31,231	23,278	17,667

The total book value of all assets is \$93,205.12, of which \$9,905.11 is the estimated value of the library and furniture.

Respectfully submitted,

KARL R. KENNISON, *Treasurer.*

TABLE 1. — RECEIPTS AND EXPENDITURES

[Figures in parentheses are the Secretary's account numbers]

Current Fund

Receipts

Balance March 10, 1932		\$1,867 02
Transferred from Permanent Fund income		2,488 80
Transferred from Clemens Herschel Fund income	(6)	15 00
Transferred from John R. Freeman Fund income	(32)	300 00
Transferred from Desmond FitzGerald Fund income	(32)	200 00
Transferred from Edmund K. Turner Fund income	(44)	50 00
Transferred from Alexis H. French Fund income	(44)	75 00
Meetings:		
Social activities	(13)	\$242 95
JOURNAL:		
Sale of reprints	(33)	97 00
Advertising	(34)	926 50
Sale of JOURNALS	(35)	211 25
Library:		
Fines	(45)	5 60
Miscellaneous:		
Badges	(51)	27 00
Binding JOURNALS for members	(52)	26 00
Miscellaneous receipts	(54)	72
Total distributed receipts		\$1,537 02
Dues, including \$205 contributed	(70)	6,030 25
Total received from Secretary for Current Fund		7,567 27
		<u>\$12,563 09</u>

Expenditures

Office:

Secretary — salary and expense	(1)	\$275 00
Stationery, printing and postage	(2)	333 13
Incidentals and petty cash	(3)	260 16
Insurance and Treasurer's bond	(4)	30 06
Safety deposit box	(5)	10 00
Prizes	(6)	15 00

Meetings:

Rent of halls, etc.	(11)	205 00
Stationery, printing and postage	(12)	308 41
Social activities	(13)	348 17
Reporting	(14)	16 00
Stereopticon	(15)	53 25
Annual meeting	(16)	69 97

Sections:

Sanitary Section	(21)	33 90
Designers Section	(22)	70 85
Highway Section	(23)	10 45
Northeastern University Section	(24)	16 30

JOURNAL:

Editor — salary and expense	(31)	375 00
Printing and postage	(32)	3,096 23
Reprints	(33)	122 00
Advertising, commission, etc.	(34)	242 75

Library:

Librarian — salary and expense	(41)	142 40
Periodicals	(43)	139 00
Binding	(44)	139 20

Miscellaneous:

Badges	(51)	33 00
Binding JOURNALS for members	(52)	28 00
Miscellaneous bank taxes, Treasurer's checking account	(54)	2 58

Total distributed expenditures		\$6,375 81
Engineering Societies of Boston	(59)	4,535 00
Balance March 10, 1933		\$10,910 81
		1,652 28
		\$12,563 09

Permanent Fund

Receipts

Balance March 10, 1932:		
Investments	\$49,919 29	
Cash	161 58	
		\$50,080 87
Income from investments:		
Interest:		
Bonds	\$885 00	
Co-operative banks	713 05	
Savings banks	286 85	
Checking account	8 70	
Dividends	595 20	
Total interest and dividends	\$2,488 80	
Profit on sales	44 20	
		2,533 00
Entrance fees (61)		138 00
		\$52,751 87

Expenditures

Income transferred to Current Fund	\$2,488 80
Balance March 10, 1933 — Investments	50,263 07
	\$52,751 87

John R. Freeman Fund

PRINCIPAL ACCOUNT

(No change during year)

Balance March 10, 1933:	
Investments	\$25,843 88
Cash	36 12
	\$25,880 00

INTEREST ACCOUNT

Receipts

Balance March 10, 1932	\$841 54
Interest — Checking account	\$5 12
Dividends	1,605 10
Total interest and dividends	1,610 22
	\$2,451 76

Expenditures

Traveling scholarships	\$1,808 00	
Miscellaneous	23 93	
Transferred to Current Fund, account (32)	300 00	
	(62) —————	\$2,131 93
Balance March 10, 1933		319 83
		\$2,451 76

Edmund K. Turner Fund

PRINCIPAL ACCOUNT

(No change during year)

Balance March 10, 1933 — Investments	\$993 75
--	----------

INTEREST ACCOUNT

Receipts

Balance March 10, 1932	\$23 47
Interest — Bond	50 00
	\$73 47

Expenditures

Books	\$17 10	
Transferred to Current Fund, account (44)	50 00	
	(63) —————	\$67 10
Balance March 10, 1933		6 37
		\$73 47

Desmond FitzGerald Fund

PRINCIPAL ACCOUNT

(No change during year)

Balance March 10, 1933 — Investments	\$2,005 00
--	------------

INTEREST ACCOUNT

Receipts

Balance March 10, 1932	\$312 16
Interest — Bonds	100 00
	\$412 16

Expenditures

Northeastern University scholarship	\$100 00	
Transferred to Current Fund, account (32)	200 00	
	(64) —————	\$300 00
Balance March 10, 1933		112 16
		\$412 16

Alexis H. French Fund

PRINCIPAL ACCOUNT

Receipts

Balance March 10, 1932:

Investments	\$1,040 40	
Cash	—40 40	
		\$1,000 00

Expenditures

None.		
Balance March 10, 1933 — Investments		\$1,000 00

INTEREST ACCOUNT

Receipts

Balance March 10, 1932	\$40 40	
Interest — Savings bank	39 37	
		\$79 77

Expenditures

Transferred to Current Fund, account (44)	(65)	\$75 00
Balance March 10, 1933		4 77
		\$79 77

Clemens Herschel Fund

PRINCIPAL ACCOUNT

Receipts

Balance March 10, 1932:

Investments	\$1,042 07	
Cash	—42 07	
		\$1,000 00

Expenditures

None.		
Balance March 10, 1933 — Investments		\$1,000 00

INTEREST ACCOUNT

Receipts

Balance March 10, 1932	\$42 07	
Interest — Savings bank	47 41	
		\$89 48

Expenditures

Prizes	\$11 70	
Transferred to Current Fund, account (6)	15 00	
	(66)	\$26 70
Balance March 10, 1933		62 78
		\$89 48

TABLE 2. — RECORD OF INVESTMENTS
PERMANENT FUND

	Date of Maturity or Classi- fication	Fixed or Current Interest Rate	DURING THE YEAR MARCH 10, 1932-MARCH 10, 1933				MARCH 10, 1933		
			Interest or Dividends received	Additional Amount invested	SOLD OR MATURED		Par Value or Number of Shares	Market Value	Book Value
					Amount received	Profit on Sale			
Bonds									
American Tel. & Tel. Co.	Dec. 1, 1946	5 %	\$50 00	-	-	-	\$1,000 00	\$1,020 00	\$993 75
Arkansas Water Co.	Oct. 1, 1956	5 %	50 00	-	-	-	1,000 00	870 00	1,005 00
Blackstone Valley Gas & Elec. Co.	Jan. 1, 1939	5 %	81 67	-	\$2,039 20	\$44 20	-	-	-
Chicago & Northwestern Ry. Co.	Nov. 1, 1987	5 %	50 00	-	-	-	1,000 00	405 00	1,102 50
Connecticut River Power Co.	Oct. 1, 1952	5 %	-6 67	\$1,927 50	-	-	2,000 00	1,900 00	1,927 50
Illinois Power & Light Corp.	Dec. 1, 1956	5 %	50 00	-	-	-	1,000 00	545 00	981 25
Kansas Power & Light Co.	Feb. 1, 1947	6 %	60 00	-	-	-	1,000 00	920 00	915 00
Louisiana Power & Light Co.	Dec. 1, 1957	5 %	50 00	-	-	-	1,000 00	800 00	835 00
Mississippi Power & Light Co.	Dec. 1, 1957	5 %	50 00	-	-	-	1,000 00	640 00	972 50
Pennsylvania Power & Light Co.	Apr. 1, 1981	4½ %	45 00	-	-	-	1,000 00	860 00	970 00
Public Electric Light Co.	Oct. 1, 1956	5½ %	110 00	-	-	-	2,000 00	1,460 00	1,975 00
Southern Pacific Co.	Mar. 1, 1977	4½ %	45 00	-	-	-	1,000 00	580 00	955 00
Tennessee Public Service Co.	Oct. 1, 1970	5 %	50 00	-	-	-	1,000 00	800 00	1,002 50
Wheeling Electric Co.	May 1, 1941	5 %	200 00	-	-	-	4,000 00	4,140 00	3,845 00
Total, Bonds	-	-	\$885 00	\$1,927 50	\$2,039 20	\$44 20	-	\$14,940 00	\$17,480 00
Co-operative Banks									
Merchants Co-operative Bank	Dec. 1939	5 %	\$88 20	\$448 20	-	-	30 Ser. 140	-	\$2,042 40
Volunteer Co-operative Bank	Jan. 1936	5 %	161 25	461 25	-	-	25 Ser. 135	-	3,514 25
Volunteer Co-operative Bank	Mat. Shs.	5 %	100 00	-	-	-	\$2,000 00	-	2,000 00
Watertown Co-operative Bank	Reinv. Ser.	5 %	363 60	363 60	\$413 60	-	40 Ser. 79	-	7,399 60
Total, Co-operative Banks	-	-	\$713 05	\$1,273 05	\$413 60	-	-	\$14,956 25	\$14,956 25

Savings Banks

Eliot Savings Bank, Boston .
Lynn Five Cents Savings Bank .

Total, Savings Banks

Stocks

American Tel. & Tel. Co. .
Consolidated Gas Co. of N. Y. .
General Electric Co. .
Radio Corporation of America .
New England Power Assoc. .
New York Central R.R. Co. .
North American Trust .
United States Steel Co. .

Total, Stocks

Cash

Total, Permanent Fund

	-	4 %	\$133 44	\$133 44	-	-	\$3,436 78
	-	4 %	153 41	153 41	-	-	2,990 50
Total, Savings Banks	-	-	\$286 85	\$286 85	-	\$735 02	\$6,427 28
American Tel. & Tel. Co.	-	\$9 00	\$414 00	-	-	46	\$5,346 04
Consolidated Gas Co. of N. Y.	-	4 00	80 00	-	-	20	880 00
General Electric Co.	-	40	11 00	-	-	20	235 00
Radio Corporation of America	Com.	-	-	-	-	3 1/2	12 50
New England Power Assoc.	Pref.	6 00	60 00	-	-	10	380 00
New York Central R.R. Co.	-	-	-	-	-	10	145 00
North American Trust	Cum., 1953	104	25 20	-	-	200	300 00
United States Steel Co.	Com.	-	5 00	-	-	10	245 00
Total, Stocks	-	-	\$595 20	-	-	-	\$6,613 50
Cash	-	-	8 70	-	-	-	-
Total, Permanent Fund	-	-	\$2,488 80	\$3,487 40	\$44 20	-	\$50,263 07

JOHN R. FREEMAN FUND

Stocks

Alabama Power Co. .
American Superpower Corp. .
Carolina Power & Light Co. .
Commonwealth & Southern Corp. .
Commonwealth & Southern Corp. .
Consumers Power Co. .
Electric Power & Light Corp. .
Electric Power & Light Corp.

Alabama Power Co.	Cum. Pref.	\$7 00	\$70 00	-	-	10	\$465 00	\$980 00
American Superpower Corp.	Pref. nce	-	30 00	-	-	20	1,140 00	1,940 00
Carolina Power & Light Co.	Cum. Pref.	7 00	70 00	-	-	10	360 00	1,020 00
Commonwealth & Southern Corp.	Cum. Pref.	6 00	48 00	-	-	8	238 00	1,019 89
Commonwealth & Southern Corp.	Com.	-	-	-	-	25	43 75	1,020 00
Consumers Power Co.	Cum. Pref.	6 00	60 00	-	-	10	665 00	1,020 00
Electric Power & Light Corp.	Cum. Pref.	2 33	58 33	-	-	10	100 00	1,076 20
Electric Power & Light Corp.	Com.	-	2 50	-	-	10	42 50	

TABLE 2. — RECORD OF INVESTMENTS — *Continued*
JOHN R. FREEMAN FUND — *Concluded*

	Date of Maturity or Classification	Fixed or Current Interest Rate	DURING THE YEAR MARCH 10, 1932-MARCH 10, 1933				MARCH 10, 1933		
			Interest or Dividends received	Additional Amount invested	SOLD OR MATURED		Par Value or Number of Shares	Market Value	Book Value
					Amount received	Profit on Sale			
Stocks—Concluded									
Georgia Power Co.	Cum. Pref.	6 00	\$84 00	—	—	14	\$714 00	\$1,143 33	
Minnesota Power & Light Co.	Pref.	7 00	70 00	—	—	10	470 00	980 00	
Mississippi River Power Co.	Cum. Pref.	6 00	60 00	—	—	10	840 00	900 00	
Montreal Light, Heat & Power Cons.	Com.	1 50	85 45	—	—	66	1,485 00	1,497 68	
New England Power Assoc.	Pref.	6 00	60 00	—	—	10	380 00	970 00	
New England Power Co.	Pref.	6 00	60 00	—	—	10	900 00	960 00	
Northwestern Electric Co.	Cum. 1st Pr.	3 50	61 30	—	—	10	360 00	980 00	
Pacific Gas & Electric Co.	Cum. 1st Pr. 6%	1 50	90 00	—	—	60	1,440 00	1,922 02	
Pacific Gas & Electric Co.	1st Pr. 5½%	1 375	27 52	—	—	20	427 50		
Pacific Gas & Electric Co.	Com.	2 00	128 00	—	—	64	1,560 00	1,808 79	
Penn. Gas & Elec. Corp.	Pref.	7 00	210 00	—	—	30	1,890 00	2,955 00	
Southern Cal. Edison Co.	Cum. Orig. Pr.	2 00	80 00	—	—	40	1,520 00	1,161 22	
Southern Cal. Edison Co.	Com.	2 00	40 00	—	—	20	420 00	539 75	
The Tenn. Elec. Power Co.	1st Pref.	7 00	70 00	—	—	10	550 00	950 00	
Utah Power & Light Co.	Cum. Pref.	7 00	70 00	—	—	10	290 00	990 00	
West Penn Power Co.	Cum. Pref.	7 00	70 00	—	—	10	1,010 00	1,030 00	
Total, Stocks	—	—	\$1,605 10	—	—	—	\$17,310 75	\$25,843 88	
Cash:									
Principal account	—	—	—	—	—	—	36 12	36 12	
Interest account	—	—	5 12	—	—	—	319 83	319 83	
Total, John R. Freeman Fund	—	—	\$1,610 22	—	—	—	\$17,666 70	\$26,199 83	

EDMUND K. TURNER FUND

	Dec. 1, 1946	5 %							
Bonds									
American Tel. & Tel. Co. . .			\$50 00	-	-	-	\$1,000 00	\$1,020 00	\$993 75
Total, Bonds . . .	-	-	\$50 00	-	-	-	-	\$1,020 00	\$993 75
Cash — Interest account . .	-	-	-	-	-	-	-	6 37	6 37
Total, Edmund K. Turner Fund	-	-	\$50 00	-	-	-	-	\$1,026 37	\$1,000 12

DESMOND FITZGERALD FUND

	Aug. 1, 1956 Jan. 1, 1957	5 % 5 %							
Bonds									
Central Power & Light Co. . .			\$50 00	-	-	-	\$1,000 00	\$522 50	\$1,005 00
Southwestern Gas & Elec. Co. .			50 00	-	-	-	1,000 00	640 00	1,000 00
Total, Bonds . . .	-	-	\$100 00	-	-	-	-	\$1,162 50	\$2,005 00
Cash — Interest account . .	-	-	-	-	-	-	-	112 16	112 16
Total, Desmond Fitzgerald Fund	-	-	\$100 00	-	-	-	-	\$1,274 66	\$2,117 16

ALEXIS H. FRENCH FUND

		3½ %							
Savings Banks									
Boston Five Cents Savings Bank .	-	-	\$39 37	\$39 37	\$79 77	-	-	-	\$1,000 00
Total, Savings Banks . . .	-	-	\$39 37	\$39 37	\$79 77	-	-	\$1,000 00	\$1,000 00
Cash — Interest account . .	-	-	-	-	-	-	-	4 77	4 77
Total, Alexis H. French Fund	-	-	\$39 37	\$39 37	\$79 77	-	-	\$1,004 77	\$1,004 77

TABLE 2. — RECORD OF INVESTMENTS — *Concluded*
CLEMENS HERSCHEL FUND

	DURING THE YEAR						MARCH 10, 1933			
	Date of Maturity or Classification	Fixed or Current Interest Rate	MARCH 10, 1932—MARCH 10, 1933				Par Value or Number of Shares	Market Value	Book Value	
			Interest or Dividends received	Additional Amount invested	SOLD OR MATURED					
					Amount received	Profit on Sale				
Savings Banks										
Charlestown Five Cents Savings Bank	- - -	4½%	\$47 41	\$47 41	\$89 48	-	-	-	\$1,000 00	
Total, Savings Banks	- - -	-	\$47 41	\$47 41	\$89 48	-	-	\$1,000 00	\$1,000 00	
Cash — Interest account	- - -	-	-	-	-	-	-	62 78	62 78	
Total, Clemens Herschel Fund	- - -	-	\$47 41	\$47 41	\$89 48	-	-	\$1,062 78	\$1,062 78	
ALL FUNDS										
Total, Investment Funds	- - -	-	\$4,335 80	\$3,574 18	\$3,357 07	\$44 20	-	\$64,972 31	\$81,647 73	
Cash in Current Fund	- - -	-	-	-	-	-	-	1,652 28	1,652 28	
Total, Funds	- - -	-	-	-	-	-	-	\$66,624 59	\$83,300 01	

TABLE 3. — DISTRIBUTION OF ASSETS, MARCH 10, 1933

	Current Fund	INVESTMENTS						Inventory	Total
		Permanent Fund	John R. Freeman Fund	Edmund K. Turner Fund	Desmond Fitzgerald Fund	Alexis H. French Fund	Clemens Herschel Fund		
<i>Assets</i>									
Bonds	—	\$17,480 00	—	\$993 75	\$2,005 00	—	—	—	\$20,478 75
Co-operative banks	—	14,956 25	—	—	—	—	—	—	14,956 25
Savings banks	—	6,427 28	—	—	—	\$1,000 00	\$1,000 00	—	8,427 28
Stocks	—	11,399 54	\$25,843 88	—	—	—	—	—	37,243 42
Cash:									
Principal account	—	—	36 12	—	—	—	—	—	36 12
Interest account	\$1,652 28	—	319 83	6 37	112 16	4 77	62 78	—	2,158 19
Total Funds — Book value	\$1,652 28	\$50,263 07	\$26,199 83	\$1,000 12	\$2,117 16	\$1,004 77	\$1,062 78	—	\$83,300 01
(Market value)	(1,652 28)	(42,937 03)	(17,666 70)	(1,026 37)	(1,274 66)	(1,004 77)	(1,062 78)	—	(66,624 59)
Library and furniture	—	—	—	—	—	—	—	\$9,905 11	9,905 11
Total Assets — Book value	—	—	—	—	—	—	—	—	\$93,205 12
<i>Liabilities</i>									
None.									
<i>Corresponding Totals in Previous Years</i>									
Book value:									
March 1, 1932	\$1,867 02	\$50,080 87	\$26,721 54	\$1,017 22	\$2,317 16	\$1,040 40	\$1,042 07	\$9,905 11	\$93,991 39
(Market value)	—	(46,488 33)	(23,277 66)	—	—	—	—	—	—
March 1, 1931	2,244 24	49,108 37	26,721 33	1,007 92	2,217 16	1,000 00	1,000 00	9,905 11	93,204 13
March 1, 1930	1,011 64	48,688 37	27,614 81	1,019 37	2,217 16	—	—	9,905 11	90,456 46
March 1, 1929	489 08	47,875 87	27,472 79	1,018 92	2,217 16	—	—	9,905 11	88,878 93

REPORT OF AUDITING COMMITTEE FOR YEAR 1932-33

BOSTON, March 11, 1933.

We have examined the accounts of the Treasurer of the Boston Society of Civil Engineers and find the books properly kept and the various expenditures of the past year supported by duly approved receipts.

The Treasurer has also accounted to us for the investments and cash on hand, as submitted in the above report.

GORDON M. FAIR,
JOHN C. MOSES,
*Auditing Committee of the Directors of the
Boston Society of Civil Engineers.*

Report of the Secretary

BOSTON, MASS., March 15, 1933.

EVERETT N. HUTCHINS, Secretary, *in Account with the BOSTON SOCIETY OF CIVIL ENGINEERS, Dr.*

For cash received during the year ending March 15, 1933:

From entrance fees, new members and transfers:

8 new members, 6 juniors and 5 juniors transferred to grade of member;
total fees \$138 00

From annual dues for 1932-33, including dues from new members \$5,781 57

From back dues 210 68

From dues for 1933-34 38 00

Total from dues 6,030 25

From advertisements 926 50

From sale of JOURNALS 211 25

From reprints 97 00

From library fines and miscellaneous 6 32

From sale of badges 27 00

From binding JOURNALS for members 26 00

From Social Activities Committee (smokers) 242 95

Total receipts \$7,705 27

The above amount has been paid to the Treasurer, whose receipts the Secretary holds.

The appended table shows the expenditures for the year.

EVERETT N. HUTCHINS, *Secretary.*

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Account No.	EXPENDITURES FOR YEAR 1932-33	
Office:		
1. Secretary, salary	\$275 00	
2. Stationery, printing, postage	333 13	
3. Incidentals and petty cash	260 16	
4. Insurance and Treasurer's bond	30 06	
5. Safety deposit box	10 00	
		<u>\$908 35</u>
Meetings:		
11. Rent of halls	\$205 00	
12. Stationery, printing, postage	308 41	
13. Social activities (net) (\$348.17 — \$242.95)	105 22	
14. } Reporting and stereopticon	69 25	
15. }		
16. Annual meeting (1932)	69 97	
		<u>757 85</u>
Sections:		
21. Sanitary Section	\$33 90	
22. Designers Section	70 85	
23. Highway Section	10 45	
24. Northeastern University Section	16 30	
		<u>131 50</u>
Journal:		
31. Editor, salary and expense	\$375 00	
32. Printing and postage	3,096 23	
33. Reprints (net)	25 00	
		<u>3,496 23</u>
Library:		
41. Librarian, salary and expense	\$142 40	
42. Books	—	
43. Periodicals	139 00	
44. Binding (net)	139 20	
		<u>420 60</u>
Dues:		
59. Dues to Engineering Societies		4,535 00
Total		<u>\$10,249 53</u>

REPORT OF AUDITING COMMITTEE FOR YEAR 1932-33

BOSTON, March 10, 1933.

We have examined the records and accounts of the Secretary of the Boston Society of Civil Engineers and have satisfied ourselves that they are properly kept, and that the money received has been transferred to the Treasurer.

GORDON M. FAIR,
JOHN C. MOSES,
*Auditing Committee of the Directors of the
Boston Society of Civil Engineers.*

Report of the Editor

BOSTON, February 10, 1933.

To the Board of Government, Boston Society of Civil Engineers:

The Editor submits the following report for the calendar year 1932 (Volume XIX) of the JOURNAL.

During the year 1932 there have been published sixteen papers presented at meetings of the Society and Sections; ten other articles; and fourteen memoirs of deceased members. The December issue contains the Contents and Index for the year.

The ten issues of the JOURNAL contained 636 pages; an average of 1,324 copies of each issue were printed. The net cost was \$2,600.62, as compared with \$2,634.18 for the preceding year.

Table I includes a comparison of the costs for the JOURNAL from 1928-32, inclusive. In Table II details of cost for Volume XIX of the JOURNAL for the calendar year 1932 are shown.

Respectfully submitted,

EVERETT N. HUTCHINS, *Editor.*

TABLE I.—COMPARISON OF COSTS OF JOURNAL, 1928-32, INCLUSIVE

YEAR	Vol.	Number of Pages*	GROSS COST†		NET COST‡		Number of Cuts and Inserts
			Total	Per Page	Total	Per Page	
1928 . . .	XV	638	\$4,143 38	\$6 49	\$2,554 11	\$4 00	150
1929 . . .	XVI	641	4,525 79	7 06	2,854 17	4 45	116
1930 . . .	XVII	723	5,107 16	7 06	3,812 86	5 27	167
1931 . . .	XVIII	515	3,916 95	7 60	2,634 18	5 11	99
1932 . . .	XIX	633	3,906 87	6 17	2,600 62	4 10	108

* Includes Advertising Section and Annual Index.

† Gross cost included editing, printing, mailing and reprints.

‡ Net cost equals gross cost less amounts received for advertising, subscriptions and sales of JOURNALS.

Report of the Committee on Membership and Publicity

BOSTON, March 1, 1933.

To the Boston Society of Civil Engineers:

The Membership and Publicity Committee reports herewith upon its activities during the past year.

Membership. — As in the previous year it has seemed inopportune to attempt anything in the form of a membership drive during 1932. The problem has been, rather, that of holding existing members forced to curtail their expenses by economic circumstances. The Committee members, drawn from widely representative groups, have individually done what they could to influence wavering members to retain membership, and the considerate attitude of the Board of Government toward worthy but distressed delinquents is appreciated by all.

Publicity. — The attention of the Committee was called to the possibility of using the lecture platform as a means of informing the public concerning the part played by engineers in our communities and thereby gaining favorable publicity for the profession. A study was accordingly made by the Committee and a report forwarded to the Board of Government outlining and recommending the establishment of a Speaker's Bureau, with speakers upon a wide variety of subjects, made accessible to organizations and groups, such as service clubs, men's clubs, women's clubs, and the like, seeking addresses upon subjects of particular interest at the moment.

After due consideration the Board of Government accepted this report and referred the matter back to the Committee, with instructions to proceed with the organization of a Speaker's Bureau. However, for various reasons little or no progress has been made on this assignment. The Committee nevertheless believes that a Speaker's Bureau would be worth while, and urges upon its successors the carrying out of the plan.

Respectfully submitted,

Committee on Membership and Publicity,

ARTHUR L. SHAW, *Chairman.*

Report of the Committee on Social Activities

MARCH 13, 1933.

To the Boston Society of Civil Engineers:

The Society has held ten meetings during the year, as follows: annual meeting at the Boston City Club, 133 members present; outing with the New England Water Works Association, at Oak Hill Country Club, Fitchburg, in June, 200 attending; six regular meetings at Chipman Hall; two regular meetings at the Engineer's Club; and on October 22, 1932, an inspection trip was made to the water supply sources of the Metropolitan District.

The total number of buffet lunches served during the year was 626, or an average of 78 per meeting. The largest attendance at any meeting was 220 (students' night), the smallest, 55.

The change to the Engineer's Club was done as an experiment to help the Society's finances. The cost of the buffet suppers, figured for the past two years, was found to be 75 cents each. Because of failure to attend on the part of those who returned cards, your Society lost \$12 at one meeting. Arrangements were made with the Engineer's Club so that it would cost the Society no more than usual, and it cannot possibly lose, as your Committee pay only for those attending. Though perhaps not so convenient to some, it affords a more homelike aspect to meetings, and the food is much more desirable than your Committee can furnish under the present conditions.

To further help the finances of the Society, your chairman offered to cater for student night. By being allowed so to do, a saving of \$48 was effected to the Society, besides showing a profit of \$16.50.

If the Society continues to serve buffet suppers, members must make an accurate return of the reply cards.

Respectfully submitted,

EDWARD S. AVERELL, *Chairman.*

Report of the Committee on Relation of Sections to Main Society

BOSTON, MASS., March 15, 1933.

To the Boston Society of Civil Engineers:

During the past year this Committee has confined its activities to two features: (1) presenting to the members of the Society the advantages to be secured through membership in the individual sections; and (2) co-ordinating the program of the main Society and of the four Sections. Early in the fall a leaflet was circulated to all members of the Society outlining the scope of the activities of each of the Sections and furnishing a simple form of application for Section membership to facilitate joining the Sections. It is believed that a substantial increase in membership in the Sections resulted.

At the beginning of the current year the Committee requested tentative programs from the Executive Committees of each Section, and from the Program Committee of the Society. At a subsequent meeting of the Committee the various programs were discussed, and any desirable modifications were made which would provide a better co-ordinated program for the year.

The Chairman of the Committee attended a conference meeting at Northeastern University and presented to the students a brief outline of the Society and of its Sections, stressing particularly the advantages of joining the Northeastern University Section. It is believed that the recent adoption of a grade of student membership has been of material assistance in securing new members of the younger ages, particularly at Northeastern University.

Respectfully submitted,

For the Committee,

J. B. BABCOCK, *Chairman.*

Report of the Committee on Welfare

BOSTON, March 15, 1933.

To the Boston Society of Civil Engineers:

The Welfare Committee of the current year has interpreted its functions as being somewhat limited, in view of the greater activity of the Emergency Planning and Research Bureau, which was the outgrowth during the previous year of this Committee. The Committee, however, has endeavored to be of as much assistance as possible to the Bureau.

The Chairman of the Committee received on August 1 the sum of \$54.75, said amount having been given to the Chairman by President Horne, being balance of funds in the hands of the previous committee.

On August 5 a payment was made to the Emergency Planning and Research Bureau of \$20 out of this amount, and the balance has been disbursed from time to time, all of which has been distributed to members of the Society.

The money paid out was disbursed in such a manner that the recipients rendered some service to the Society in connection with improvement to the library and its records for the benefit of all members.

The Society is therefore duly appreciative of the donation of the Municipal Technical Engineers' Association of Boston.

Respectfully submitted,

ARTHUR W. DEAN, *Chairman.*

Report of the Library Committee, 1932-33

BOSTON, March 15, 1933.

To the Boston Society of Civil Engineers:

The Chairman submits, for the Library Committee, the following report for the year 1932-33.

During the year 411 books have been loaned to members of the Society, or to members of other societies included in the Engineering Societies of Boston, and fines amounting to \$5.60 have been collected.

The most important item in the library work this year has been the appointment of Edward S. Averell as Librarian. He has been very active and constructive in his work this year. He has repaired a large number of bound periodicals which were falling to pieces, has made a complete index of the Boston Society of Civil Engineer JOURNALS from 1914 (Vol. 1) to date, and has rearranged a number of shelves of books. Special mention should be made of his work in renumbering all the books in the technical section.

He has disposed of books as voted by the Board of Government, also made a file of geologic maps, and brought up to date the list of deceased members and list of memoirs.

In order to clear additional shelves for expansion for more important periodicals and other additions to the library a considerable number of useless periodicals, state and town reports, have been disposed of with the approval of the Board of Government.

With the exception of the usual technical periodicals no books have been purchased this year, as it was felt that the resources of the Society should be conserved for more urgent needs.

Respectfully submitted,

For the Library Committee,

HENRY B. ALVORD, *Chairman*.

Report of Committee on Registration and Licensing of Engineers

BOSTON, March 4, 1933.

To the Boston Society of Civil Engineers:

The Society received in July from the Secretary of the American Society of Civil Engineers a copy of "Model Law for the Registration of Professional Engineers and Land Surveyors," with a request that the Boston Society of Civil Engineers adopt and endorse this model law.

The draft law was forwarded to your Committee with the request that the Committee consider the matter and report back to the President, which it did.

The Committee brought out the fact that to bring the model law into conformity with the Massachusetts statutes required certain necessary changes, and the work of making this adaptation is now in the hands of the Committee.

Respectfully submitted,

Committee on Registration and Licensing of Engineers,

C. B. BREED, *Chairman*.

Report of the Committee on Research

BOSTON, March 15, 1933.

To the Boston Society of Civil Engineers:

The matter of research has not been taken up by the Committee during the past year, a state of affairs for which the Chairman accepts the responsibility. This was due in part to the work of the Committee on Sewer Assessment Laws which, with the approval of the President, took precedence over that of the Committee on Research.

The list of subjects for research, published in the JOURNAL of the Boston Society of Civil Engineers for February, 1932, has not been productive of additional papers as was hoped. A number of these subjects have been used, however, by the Emergency Planning and Research Bureau as "knitting work" when other work was not available, and the results of some of these studies are now in preparation or in the hands of members of the Society for review.

It is apparent that active steps must be taken, preferably by a committee of the Society, if interest in research work is to be stimulated to the point of producing papers of value.

It is obvious that under present conditions the Society cannot contribute funds for such work, but must rely on the members to do personal work along lines that do not require the expenditure of money for materials or equipment. The question of publication of papers may also need consideration.

It is recommended that the matter of research activities be referred to the Board of Government.

Respectfully submitted,

For the Committee,

FRANK A. MARSTON, *Chairman*.

Progress Report of the Committee on Run-off

LOWELL, March 6, 1933.

To the Boston Society of Civil Engineers:

The Run-off Committee of the Boston Society of Civil Engineers herewith makes a report of progress to the annual meeting. There have been three meetings of the full Committee, and two of the steering committee.

By co-operation with Mr. Kinnison's office, the hydrographs and duration curves for certain picked rivers in New England have been brought up to date and are ready for analysis. Topics for study and writing up have been given to individual members of the Committee, and it is intended to have the report ready for the annual meeting in 1934.

The extreme drought of 1930 was followed by a less severe one of 1931, and a comparatively normal year in 1932. At the time of writing, the absence of snow on the ground in the early winter of 1932-33 has been made up during February, and the run-off for the spring of 1933 is likely to be more nearly normal than for the few years previous.

The business depression, with economies all along the line and a much reduced use of manufacturing and domestic water, has made the drought much less felt by water works and water companies than if the use of water had been normal. But the appearance of the Wachusett reservoir at the end of 1930 is still too vivid in our minds to forget the need of rainfall and more rainfall if our streams and water supplies are to continue to function.

Respectfully submitted,

Run-off Committee,

ARTHUR T. SAFFORD, *Chairman*.

Progress Report of the Committee on Subsoils of Boston

BOSTON, March 9, 1933.

To the Boston Society of Civil Engineers:

The purpose of this Committee is to gather data regarding the character of the subsoils of Boston and vicinity, and to present it to the Society in such form as to make it valuable for reference to any who may wish to gain a clear idea of the geological construction of the subsoils.

A rather extensive progress report was published in the JOURNAL of September, 1931.

The Committee has made considerable progress since that time, largely due to the help of men who are employed in the Emergency Planning and Research Bureau, and who were directed to assist the Committee in gathering data, making maps, card records, etc.

Chas. T. Main, Inc., has continued to furnish much in the way of labor, materials and space for this work.

Maps. — Boston and vicinity has been divided into districts, and fourteen districts have been mapped.

On these maps are recorded names of streets, contours of surface elevations, location and identification numbers of the recorded borings, and other interesting data.

Plotting and Filing. — Starting from the file of test borings previously obtained by the Subsoils Committee, new cards were made from all records in the files of Mr. Irving B. Crosby which had not already been recorded. All new records obtainable from the files of the B. F. Smith Company, the Gow Company, and other sources were written up on the Committee's standard card. The borings listed in the report of Mr. J. R. Worcester to the Boston Society of Civil Engineers in 1914 which were not already in the files were recorded on cards. At the present time new records are being collected from the Sewer Department, Boston City Hall, and from the city engineer's office at Cambridge.

In September, 1931, the Committee had records on cards of approximately 3,900 borings, and had located about 908 borings on maps.

At the present time the Committee has fourteen maps, with about 2,549 boring locations recorded thereon, showing an addition of about 1,640 borings to the card records, or a total of 5,540.

In addition to this, records have been made of about 874 excavations made largely for sewer work.

Records of 50 to 60 deep wells have been gathered and noted in the card file.

Geological Sections. — In addition to the fourteen maps and the six sections previously made, two new geological cross sections have been made by Mr. Crosby and drawn by the Bureau's men. One extends from Dorchester through South Boston to East Boston, and the other extends from Roxbury through Boston and Charlestown to Chelsea. These are preliminary, as revisions may be made in the light of new borings still to be obtained.

Plans for Future Work. — It is planned to complete the work of collecting, filing and plotting on maps the subsoil data from the fourteen districts on which work has been started. If, when this has been finished, the Bureau is still in operation and able to supply men, the work will be extended into other parts of Greater Boston, especially those parts where industrial developments are likely to take place.

It is hoped that all of this information ultimately will be published by the Society in a complete form, which will take the place of previous reports on subsoil conditions and will give all the data available at the time of publication.

A vast amount of information of practical and geological importance had been collected; but to obtain the full value from it, this information must be studied and interpreted. Such a study of subsoil conditions was begun some years ago by Mr. Crosby, and has been continued, using the data obtained by the men from the Bureau. On February 11 a paper by Mr. Crosby, entitled "The Foundation Conditions of Boston," was read before the Designers Section of the Society. Although this study is not directly a part of the Subsoil Committee's work, it has been carried out in co-operation with the

Committee. It is expected that an elaboration of this paper, with a map showing the contours of the bedrock surface and with geologic sections across the city, will be published in the JOURNAL of the Society during 1933. This will give the geological aspects of the foundation conditions of Boston and will supplement the proposed publication of the compilation of boring and subsoil data.

Mr. Crosby has given a large amount of time and study to this work, having been directly in charge of the men furnished by the Bureau.

The Committee again takes this opportunity to thank the companies making borings for their co-operation and help, particularly B. F. Smith Company and the Gow Company.

The engineers in the Boston city departments have been very helpful, as well as the city engineer of Cambridge.

The work of this Committee, as briefly outlined above, will be continued if the Society so desires.

Respectfully submitted,

For the Committee,

HARRY E. SAWTELL, *Chairman*.

Report of Board of Reference

BOSTON, February 27, 1933.

To the Boston Society of Civil Engineers:

No matters have been referred to the Board of Reference during the year, so there is nothing to be reported.

Respectfully submitted,

EUGENE E. PETTEE, *Chairman*.

Report of the John R. Freeman Fund Committee

MARCH 15, 1933.

To the Boston Society of Civil Engineers:

At the annual meeting of the Boston Society of Civil Engineers, March 25, 1925, there was announced the gift to the Society by John R. Freeman of \$25,000 to be called the "Freeman Fund."

The substance of Mr. Freeman's stipulations for the use of the income of this fund, in the order in which they were mentioned by him, were as follows:

1. Toward experiments, observations, research and compilation of data that will be useful in engineering.
2. For underwriting in whole or in part publications of meritorious books or papers or translations pertaining to hydraulic science or art.
3. A prize for the most useful paper relating to hydraulics contributed to the Society.

4. A triennial travel scholarship for visiting and studying engineering works in any part of the world.

At the same time Mr. Freeman made a similar gift to the American Society of Civil Engineers and to the American Society of Mechanical Engineers.

A committee was appointed in each Society to recommend use of the income from the fund, Mr. Freeman being the Chairman of each committee, and his wishes, to a large extent, controlled the actions of the committees.

After his death it became necessary to reorganize the committees to some extent, and to get the three committees working together so that they will carry out to the best advantage the written wishes of Mr. Freeman. We are working on this now, and I do not anticipate any difficulty in bringing it about.

The Boston Society of Civil Engineers has granted four travel scholarships, as follows:

Kenneth C. Reynolds, Assistant Professor of Hydraulics, Massachusetts Institute of Technology.

Samuel Schultz, Beuthsthe Technische Hochschule, Brno, Czechoslovakia.

Clifford P. Kittredge, Assistant in Mechanical Engineering, Massachusetts Institute of Technology.

Laurence De Fabritis, who is now in Germany.

This makes four awards in seven years, or double the number suggested by Mr. Freeman, but they were made under his advice.

The committee of the American Society of Civil Engineers has decided not to recommend the award of a travel scholarship this year.

Your Committee has also decided not to award a scholarship, but to devote a portion of the income to other purposes, one of which, already authorized, is an allotment of \$300 for publication of the discussion on the report of the Flood Committee, and other uses will be determined later.

The American Society of Mechanical Engineers will be the only Society awarding a scholarship this year.

Respectfully submitted,

John R. Freeman Fund Committee,

CHARLES T. MAIN, *Chairman*.

Report of the Executive Committee of the Sanitary Section

BOSTON, March 1, 1933.

To the Sanitary Section, Boston Society of Civil Engineers:

During the past year four meetings were held, as follows:

March 2, 1932. — Annual meeting. "The Hydraulics of Sewer Transitions," by Professor Thomas R. Camp, Massachusetts Institute of Technology (illustrated); *attendance*, 48.

October 5, 1932. — Regular meeting. "The Construction of Sanitary Works for Unemployment Relief," by Arthur D. Weston, Chief Engineer, Massachusetts Department of Public Health; *attendance*, 27.

December 7, 1932. — Special meeting. "A Review of Recent Developments in Sewage Treatment Works," by Frank L. Flood, Assistant Engineer, Metcalf & Eddy (illustrated); *attendance, 41.*

February 1, 1933. — Special meeting. "The Pollution and Self-Purification of the Pocasset River at Rhode Island," by Frank W. Gilcreas, Chemist, Weston & Sampson (illustrated); *attendance, 27.*

Attendance. — Attendance at meetings has varied from 27 to 48, averaging 36, a gain of 2 over last year.

Membership. — The present membership of the Section is 198. During the past year 28 new members were added to the roll, 3 were lost by resignation, and 4 by death, 9 forfeited.

Executive Committee Meetings. — Six meetings of the Executive Committee have been held during the past year.

Respectfully submitted,

For the Executive Committee,

FRANK L. FLOOD, *Clerk.*

Report of the Executive Committee of the Designers Section

BOSTON, March 4, 1933.

To the Designers Section, Boston Society of Civil Engineers:

During the past year eight regular meetings of the Section have been held. Brief summaries of these meetings follow:

March 9, 1932. — Annual meeting, election of officers. "The Strength of Ships," by Prof. F. Alexander Magoon, Massachusetts Institute of Technology; *attendance, 22.*

April 13, 1932. — "The Hardy Cross Method for the Analysis of Continuous Frames," by W. W. Bigelow and O. G. Julian, both engineers with Jackson & Moreland; *attendance, 47.*

May 11, 1932. — "Beauty in Bridges," by Prof. Edwin H. Wright, head of Fine Arts Department, Tufts College; *attendance, 40.*

October 13, 1932. — "Lumber, its Design and Uses," by Prof. Irving H. Cowdrey, Massachusetts Institute of Technology; Stuart N. Huckins of the Tim-Manson-Huckins Company; Frank H. Alcott of the National Lumber Manufacturers Association; and Edward Roemer, Building Commissioner of Boston; *attendance, 43.*

November 9, 1932. — "Design and Construction of Reinforced Concrete Chimneys," by E. A. Dockstader of Stone & Webster; *attendance, 23.*

December 14, 1932. — "Some Fundamentals of Public Utility Valuation," by Arthur Schweier; *attendance, 31.*

January 12, 1933. — This meeting was devoted to short papers by members of the Section. The subjects and speakers were: "Combined Stresses in Steel Columns," by LeRoy M. Hersum; "Some Phases of Continuous Beams," by Prof. Robinson Abbott, Tufts College; "A Few Mathematical Stunts," by W. W. Bigelow; "Ways to Lessen Cost in Steel Structures," by Frederick Crabtree; "The Resistance of Footings to Uplift," by Abraham Wolf; *attendance, 45.*

February 8, 1933. — "The Foundation Conditions of Boston," by Irving B. Crosby, Consulting Geologist; *attendance, 55.*

The average attendance was 38; last year it was 76.

During the year 30 new members were added, 4 resigned, 14 were dropped and 1 died. The net membership this year is 174; last year it was 173.

Respectfully submitted,

For the Executive Committee,

HERMAN G. DRESSER, *Clerk.*

Report of the Executive Committee of the Highway Section

BOSTON, March 15, 1933.

To the Boston Society of Civil Engineers:

During the past year two meetings have been held, one of which was an excursion meeting.

February 17, 1932. — Annual meeting. There was a joint meeting with the main Society.

October 1, 1932. — Excursion and inspection trip to the East Boston Vehicular Tunnel, under the guidance of engineers of the Boston Transit Department; *attendance*, 150.

Other meetings had been planned, but conditions developed which necessitated their cancellation.

The present membership of the Section is 98.

Respectfully submitted,

For the Executive Committee,

ARTHUR P. RICE, *Clerk.*

Report of the Executive Committee of the Northeastern University Section

BOSTON, March 10, 1933.

To the Boston Society of Civil Engineers:

The Northeastern University Section has held six meetings including inspection trips during the year, as follows:

April 27, 1932. — Annual meeting. Supper, Café de Paris. *Speaker*, Mr. J. E. Griffin, National Brick Pavement Association, on "Brick Pavements" (illustrated motion pictures, slides).

October 12, 1932. — Joint excursion with the Boston Society of Civil Engineers to the East Boston Tunnel.

November 17, 1932. — Frank L. Flood of Metcalf & Eddy, on "3,500 Mile Inspection of Sewage Disposal Works in the United States" (illustrated).

December 7, 1932. — J. L. Herber of International Cement Corporation, on "High Early Strength Cement" (illustrated); and Ralph W. Horne, President, the Boston Society of Civil Engineers, on "Membership in the Boston Society of Civil Engineers."

January 11, 1933. — A. B. Loveland of Boston Transit Commission, on "East Boston Traffic Tunnel" (illustrated); and Prof. John B. Babcock, on "Membership in the Boston Society of Civil Engineers."

January 17, 1933. — Excursion through East Boston Tunnel, with Mr. Loveland as guide.

Membership. — At present there are 212 members in the Section, of which 42 are new members.

Attendance. — The average attendance during the year has been approximately 80.

Respectfully submitted,

ANTHONY TEDESCO, *Chairman.*

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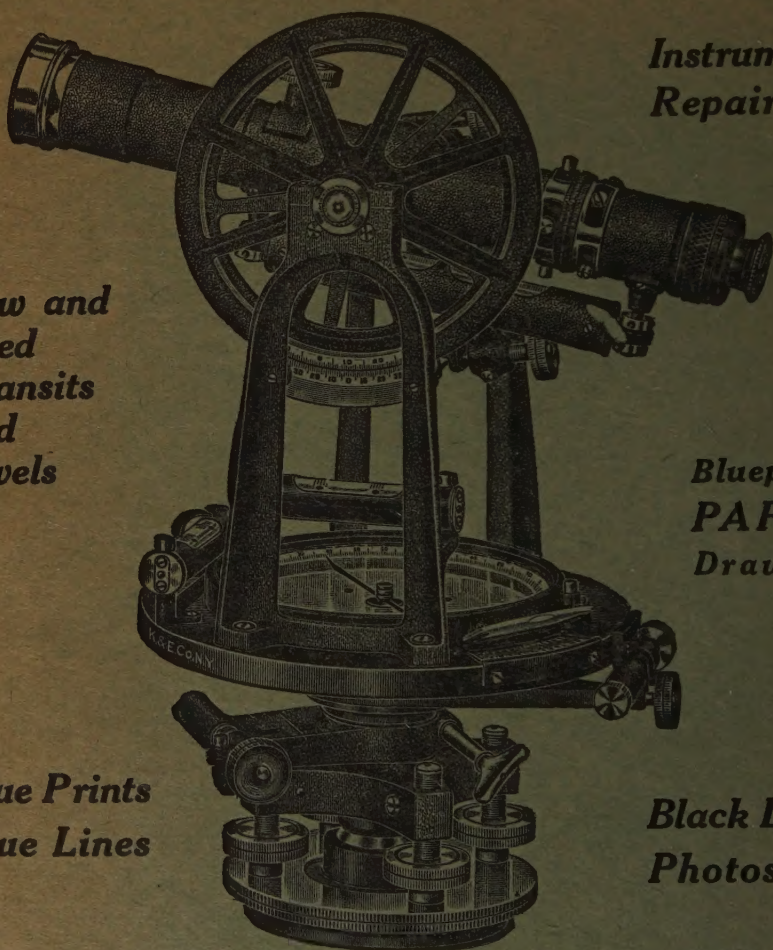
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